CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0653 COMBINED SCIENCE

0653/61 Paper 6 (Alternative to Practical), maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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1 **(a)** **(i)** *first row*: 10, 10, 10, 10 ;

(ii) *second row*: 0, 9, 0, 10 ;

(b) light not necessary ;
water is necessary ; [2]

(c) to improve reliability / because some seeds might be dead or damaged / to take account of individual variability ; [1]

(d) any two of:
temperature ;
oxygen / air ;
pH ; [max 2]

(e) *starch* – seeds ;
reducing sugar – radicles / roots ; [2]

(f) amylase / carbohydrase / diastase ; [1]

[Total: 10]

2 **(a)** **(i)** 64.5 ;
59.2 ; [2]

(ii) (64.5 – 40 =) 24.5 ***and*** (59.2 – 40 =) 19.2 (both correct) ; [1]

(iii) 1/70 = 0.014 ;
1/90 = 0.011 ;
(penalise incorrect d.p. once only) [2]

(b) **(i)** correct plots of 4 or 5 points ;
straight line drawn ; [2]

(ii) *x*- and *y*- distances shown on graph ;
y/*x* correctly calculated (1600 to 1800) ; [2]

(c) 300 – gradient / 10 correctly calculated from candidate's graph (around 120 to 140), do not allow impossible masses e.g. negative ; [1]

[Total: 10]

3 **(a)** same mass of soil / same volume of water ; [1]

(b) (from) blue ;
(to) red ; [2]

(c) **(i)** 4.4 ;
4.9 ;
5.2 ; [3]

(ii) 5.6, 5.1, 4.8 (all three, ecf) ; [1]

(iii) (5.6 + 5.1 + 4.8 = 15.5, 15.5/3 =) 5.17 **OR** 5.2 ; [1]

(d) $2 \times 0.013 \times 10 / 5.2 = 0.05$ (mol / dm^3) (ecf) ;
(ignore more d.p.) [1]

(e) the (insoluble) hydroxides (of the metals) are formed / owtte ; [1]

[Total: 10]

4 **(a)**

condition of leaves	*time / mins*	*reading on scale / cm*	*distance moved by bubble per minute / cm*	*average distance moved by bubble per minute / cm*
untreated	*1*	1.6	1.6	1.57 **OR** 1.6
	2	3.3	1.7	
	3	4.7	1.4	

(i) as in column 3 ; [1]

(ii) as in column 4 ; [1]

(iii) as in column 5 ; [1]

(b) **(i)** 1.2/1.6 × 100 ;
= 75 % ; (accept 76 % if 1.57 used) [2]

(ii) cover the lower surface with grease (this should stop all transpiration) ;
(candidates may suggest to repeat the experiment, this time with untreated and then lower surface greased. the mark should be allowed for this) [1]

(c) any two of:
change in air speed ;
temperature ;
humidity ;
light ; [max 2]

(d) (i) to prevent air bubbles from entering the shoot ; [1]

(ii) water used in plant for photosynthesis / maintaining cell turgor / cell expansion / produced by respiration ; [1]

[Total: 10]

5 (a) **1a** green ;
1b purple / blue ; [2]

(b) (sodium) sulfate ; [1]

(c) (sodium) chloride ;
(sodium) nitrate ; [2]

(d) (i) (ii) (litmus is blue at first and then) turns red ;
(litmus is blue at first and then) turns red ;
bubbles are given off ; [3]

(e) (i) barium sulfate; [1]

(ii) a solid is formed from a solution / insoluble solid forms ; [1]

[Total: 10]

6 (a) (i) heat ;
light ; (either order) [2]

(ii) argon **OR** inert gas ; [1]

(b) A and V shown in correct places in the circuit ; [1]

(c) 0.6 A ;
12 V ; [2]

(d) (i) 150 / 240 = 0.6(25) A ;

(ii) the resistance must be much higher at the higher e.m.f. (because of the higher temperature) ;

[

(e) heat is made (instead of light) ;
and one of:
so that (electrical) energy is wasted / not needed / lost ;
more energy needs to be generated / fossil fuels need to be used (to make electricity) ;

[max 2]

[Total: 10]